C H A P T E R   1 7
SAN Performance Tuning

This chapter provides information and instructions for improving the performance of the various storage area network (SAN) components in your network. All procedures in this document require administrator access permissions.

This chapter provides information about the following components:

- Dell OpenManage Data Managed Node Data Agent for 650F and 651F storage systems

- Running multiple copies of Data Managed Node Data Agent in a SAN

- RAID considerations for 650F and 651F storage systems

- Cache size for 650F and 651F storage systems

- Setting the execution throttle

- Setting the PowerVault 650F and 651F cache water mark

- Network timeouts

Dell OpenManage Data Managed Node Data Agent for 650F and 651F Storage Systems

When the Dell OpenManage Application Transparent Failover (ATF) software is not installed, the Dell OpenManage Data Managed Node Data Agent's commands for polling and configuring the 650F and 651F storage systems are intermixed with the normal input/output (I/O) activities that are being generated by the system application programs. This intermixing of the different types of I/O causes the management I/O to be delayed, which causes the Dell PowerVault manager applications to time out while communicating with the array. If a system is experiencing I/O time-out errors during heavy I/O activity, you can improve performance by changing the agent management I/O path to go through a dedicated logical unit number (LUN) rather than the physical drive device driver. Change the entries in the Data Agent Configurator's **Device** window to specify the dedicated LUN by performing the following steps:

1. Click **Start—> Programs—> Dell OpenManage PowerVault Manager—> Data Managed Node—> Data Agent**.

2. In the **Data Agent Configurator** window, click the **Devices** menu and then click **Auto-Detect** to force the disk array to be discovered.

3. Modify the **Device** entries to point to the same LUN. For example, if the **Device** window contains the following lines:

`\\.\SCSI2:0:0:0:0`

`\\.\SCSI3:0:0:1:1`

Modify the lines as follows:

`\\.\SCSI2:0:0:0:7`

`\\.\SCSI3:0:0:1:7`

The last field in the device string represents the LUN, which is LUN 7 in this example. After a specific LUN is dedicated to the agent's communication path, do not create another LUN with the same LUN ID.

Running Multiple Copies of Data Managed Node Data Agent in a SAN

SAN performance can be affected by the number of copies of Dell OpenManage Data Managed Node Data Agent that are running in a SAN. You should run one copy (or two for backup) in your SAN. If you run Data Managed Node Data Agent on all of the servers in the SAN that have PowerVault 650F, 651F, and 630F storage systems allocated to them, you will experience a significant performance degradation on your storage systems.

RAID Considerations for 650F and 651F Storage Systems

Although you are allowed to bind RAID 5 LUNs containing from three to sixteen hard-disk drives, performance for this type of RAID has been optimized for from five to nine hard-disk drives. Under some circumstances, more than nine hard-disk drives can degrade performance. To improve performance, you can reconfigure the number of hard-disk drives you bind to each LUN.

Cache Size for 650F and 651F Storage Systems

Although you can configure cache page sizes of 2 kilobytes (KB), 4 KB, 8 KB, 16 KB, and 32 KB, Dell recommends that you set the cache page size to 8 KB for optimum performance of your PowerVault 650F and 651F storage systems.

Setting the Execution Throttle

In a SAN configuration with three or more servers, you must change the default execution throttle value in the nonvolatile random-access memory (NVRAM) for each host bus adapter (HBA). For information about calculating and setting the execution throttle, see "Setting the Execution Throttle Value for SAN Servers Connected to 650Fs, 651Fs, 660Fs, and 530Fs" in Chapter 10.

Setting the PowerVault 650F and 651F Cache Water Mark

To properly tune the Dell PowerVault 650F and 651F storage system, you need to set the high water mark (HWM) and low water mark (LWM) cache value to an appropriate value. Normally, Flare clears the cache any time it is idle and any time it reaches 100% of capacity.

HWM and LWM settings reflect the values at which the cache automatically clears its contents. The default HWM setting of 96 and the default LWM setting of 80 tell Flare to start clearing cache when it reaches 96% of its capacity and stop clearing when it reaches 80% of capacity. The values of 96 and 80 make more efficient use of available memory.

Use the following procedure to verify and change the HWM and LWM settings.

1. Using the Dell OpenManage Data Supervisor or Dell OpenManage Data Administrator **Array Configuration** menu, select **Array—> Set Watermark/High Watermark**.

2. Enter the value of 96 for the **High Watermark**, and click **OK**.

3. When the watermark setting confirmation window opens, click **OK**.

4. In the **Array Configuration** menu, select **Array—> Set Watermark—> Low Watermark**.

5. Enter the value of 80 for the **Low Watermark**, and click **OK**.

6. When the watermark setting confirmation window opens, click **OK**.

Network Timeouts

System timeouts that cause interruptions in data flow can have a significant negative affect on data traffic flow in the SAN. Ensuring that timeout parameters, such as the 530F health timeout value, are set correctly might provide better throughput.

530F SAN Appliance

When the 530F is configured in an Internet Protocol (IP) mirror network using the asynchronous transfer mode (ATM) protocol, the IP mirror link may intermittently go down due to timeouts. The timeout causes a break in the asynchronous data transfer between 530F systems. To correct these timeouts, set the timeout parameter in the 530F SAN appliance software for the host, secondary, and remote systems to a health timeout value of 6. This extended timeout value provides these systems with additional tolerance for intermittent breaks in the IP mirror link without interrupting the asynchronous data transfer between systems. For detailed instructions on setting the health timeout value, see the *Resetting the Timeout Parameter in the Dell PowerVault 530F SAN Appliance Software* document, which can be found on Dell Web site at **http://support.dell.com**.